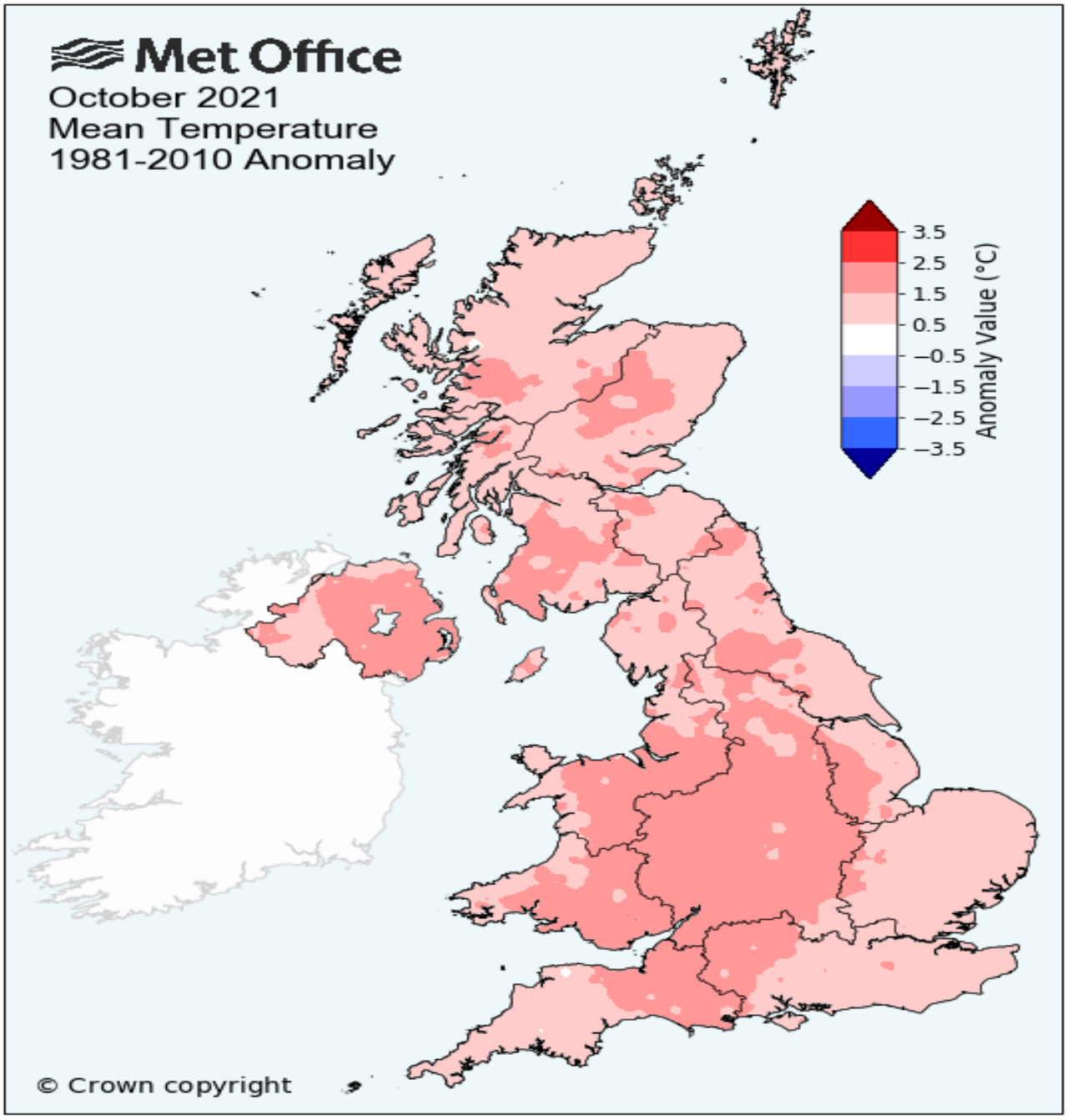
Warm and wet October for the UK

Description

October 2021 was a warm and wet month for the UK, with a typically autumnal mix of weather types with warm spells, frequent showers and some persistent heavy rain. That is according to provisional figures released by the Met Office.

UK mean temperatures have been 1.4°C above the long-term average for October, standing at 10.9°C. It's a similar warm theme across the regions of the UK, with England's October mean temperature at 11.8°C (1.4°C above average), Wales at 11.4°C (1.6°C above average), Scotland at 9.2°C (1.3°C above average) and Northern Ireland at 11.0°C (1.6°C above average).

As you'd expect, average maximum temperatures were also more than 1°C above the long-term averages, with the most noteworthy being seen in Northern Ireland, with their average maximum temperature for the month at 14.2°C making it its joint-eighth warmest on record with figures going back to 1884. The warmest October for Northern Ireland by maximum temperature was in 1969, when the average maximum temperature was 15.1°C.



October 2021 mean temperature versus the long term average

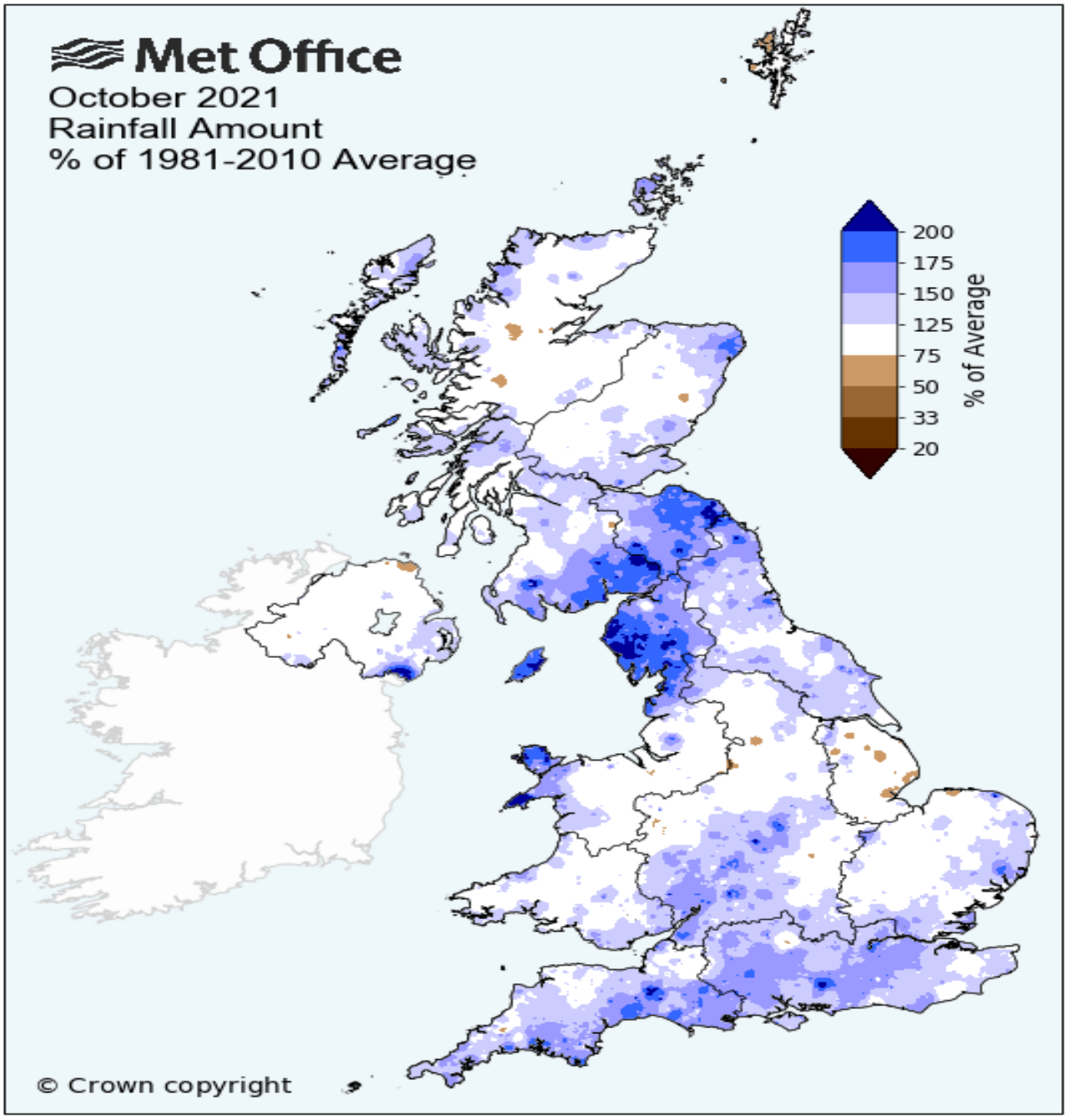
It was also a wet month for many, although not enough to threaten any national records. An average of 162.7mm of rain fell across the UK, which represents 28% more than the average for October. This figure was spurred on by some persistent heavy rain over a number of days in the latter half of the month, with some noteworthy consecutive-day rainfall totals in Cumbria in particular.

Honister Pass in Cumbria saw more than 80% of its monthly rainfall over the 48-hour period from 26-27 October, as 343mm fell in the period, with the long-term average for the station in the month as a whole standing at 417.6mm. Although that's one station in isolation, 14 other stations in Cumbria also recorded more than half of their average total October rainfall across the same period. Rain persisted

through the following days resulting in very notable rainfall accumulations across the region and some significant flood related impacts. For comparison, the highest 2-day accumulation on record was 405mm which fell over 4-5 December 2015 at Thirlmere in Cumbria.

The above average rainfall was replicated across much of the UK, with England seeing a total of 124.6mm (36% more than average), Wales 209mm (23% more than average), Scotland 219.3mm (25% more than average) and Northern Ireland 126.5mm (6% more than average). However, these figures don't threaten any records, with the record average rainfall in October for the UK standing at 226.1mm in 1903.

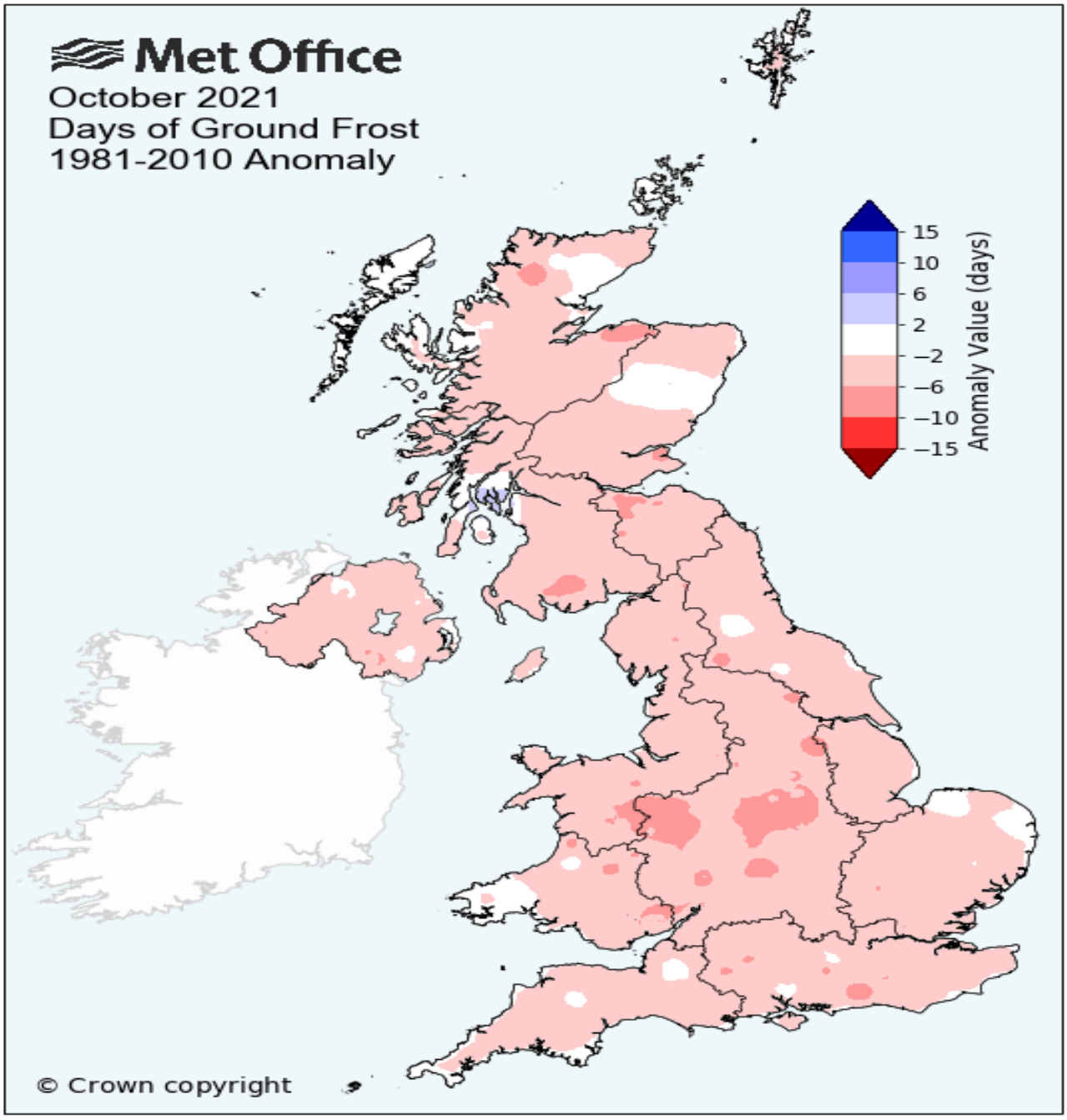
Heavy rain and high winds at the end of the month contributed to some disrupted travel conditions in the UK as people headed north to COP26 in Glasgow.



October 2021 rainfall amount versus the long term average

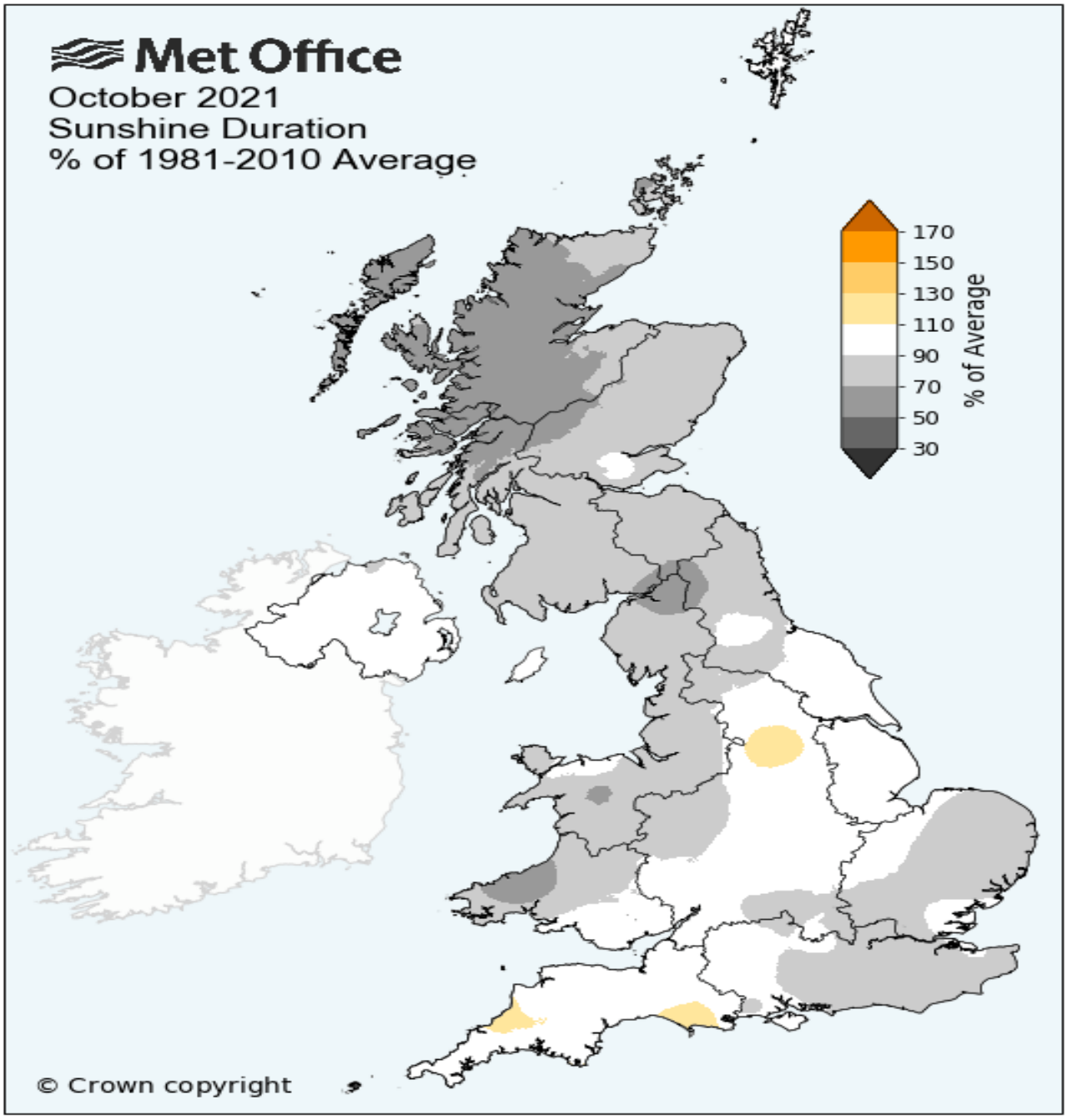
Dr Mark McCarthy of the National Climate Information Centre said, “Warm and wet was the main theme through October 2021. However, this October has really demonstrated the variability of an October in the UK, with some good dry spells for many in the middle of the month, before some heavier rain later in the month.

“The warm conditions have resulted in relatively few ground frosts compared to the average for the month. You’d normally expect six or seven days of ground frost in the UK, but most areas are below the average.”



October 2021 average ground frost versus the long term average

Sunshine hours were also subdued across the UK, especially in Scotland, where they had 26% fewer sunshine hours than the long-term average, with 55.4 hours of sunshine. The average figure for Scotland for October is 75.1 hours. The UK had 13% fewer sunshine hours than the long-term average for the month, with 80.2 hours. The average figure for the UK in October is 92.3 hours.



October 2021 sunshine amount versus the long term average

Provisional October 2021	Mean temp (°C)		Sunshine (hours)		Rainfall (mm)	
	Actual	Diff from avg (°C)	Actual	% of avg	Actual	% of avg
UK	10.9	1.4	80.2	86	162.7	128
England	11.8	1.4	95	92	124.6	136
Wales	11.4	1.6	77.1	83	209	123
Scotland	9.2	1.3	55.4	74	219.3	125

N Ireland	11.	1.6	86	98	126.5	106

Date Created
November 2021

Environmental Intelligence commitment at COP26

Description

The Met Office and the University of Exeter have signed a landmark collaboration agreement at COP26, formally committing to further grow the work of the Joint Centre for Excellence in Environmental Intelligence.

Professor Stephen Belcher, Chief Scientist at the Met Office and Professor Mark Goodwin,

Deputy Vice-Chancellor at the University of Exeter, signing the agreement as COP26.

The agreement sees the continuation of the Joint Centre, created in Exeter in December 2020, which brings together world-leading researchers from the University of Exeter and the Met Office to pioneer the development of environmental intelligence research and deliver innovative, interdisciplinary education and training.

Environmental intelligence is a new field of knowledge that joins environmental data with artificial intelligence (AI) to create solutions to some of the most important challenges facing society today.

The Joint Centre aims to provide the meaningful insight needed to inform decision making around weather and climate to improve risk management and provide the expertise, skills and capability to fully use artificial intelligence to address the threats of climate change.

The Centre also collaborates with The Alan Turing Institute, the UK's national centre for data science and AI, and provides a hub for research and training to support a community in environmental intelligence and promotes the UK as a leader in the field.

Complex interactions between the environment, climate, ecosystems, societies, economies and human health will all be under the microscope for the Joint Centre.

The signing of the collaboration agreement at COP26 represents a 5-year commitment, which will enable continued growth, development and ongoing impact of the Joint Centre in the coming years.

The Joint Centre aligns with the overarching goals of COP, with the development of a Climate Impacts, Mitigation, Adaptation and Resilience (CLIMAR) Framework creating decision-ready information for policy-makers, industry and the public to achieve net zero carbon emissions and adapt to protect communities and natural habitats.

Professor Stephen Belcher, Chief Scientist at the Met Office said, "It's vitally important that we collaborate to address some of society's most pressing issues. By working with the University of Exeter on the Joint Centre, we're able to pool talent to use the latest technology and advancements to provide tangible information for policy-makers around the globe."

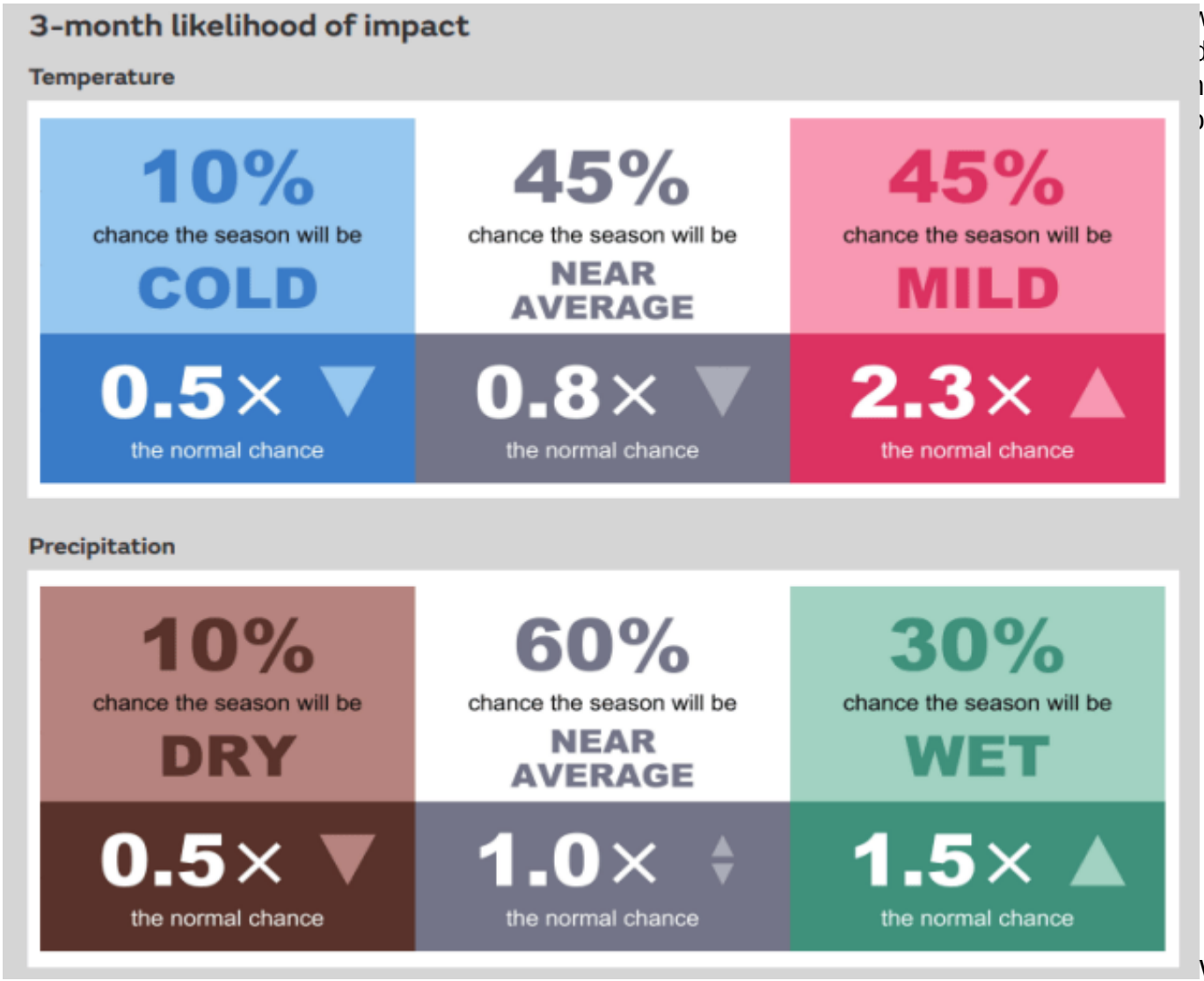
Professor Mark Goodwin, Deputy Vice-Chancellor, at the University of Exeter said, "This long-term commitment to the Joint Centre is incredibly welcome and timely. I am excited to see the potential of Environmental Intelligence being unlocked in the coming years, and further development of innovative solutions to help tackle the environmental challenges faced by humanity." The Joint Centre is holding its annual conference on 16 and 17 December 2021, with the focus on 'Beyond COP26: The Road to Net Zero'. This virtual event will showcase the use of transformative technologies to support the UK's Net Zero ambitions and explore opportunities to support the next generation of environmental and data scientists. Find out more and register on EventBrite.

Date Created
November 2021

What is the chance of the UK experiencing a wetter than average winter?

Description

The current Three-Month Outlook covers the early winter period of November to January. It is not a daily weather forecast but instead focuses on the likely chance of the average temperature and rainfall amounts occurring during the three month period.



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Within the overall dominant weather type there will always be some variability. For example, a wetter than average winter will still include drier spells and a milder winter will always include cold spells. The

Outlook gives no indication of where could see above average rainfall or heavier downpours and therefore when and where there will be impacts from rain.

Will Lang, Head of Civil Contingencies for the Met Office, said: “It is important to remember that the Three-Month Outlook does not attempt to provide a detailed forecast: instead, it gives the chance that the three-month period will be drier or wetter, warmer or cooler than average, as this information is useful to planners.

“The natural variation of our weather ensures that the day-to-day pattern will vary, and cold and wintry spells of weather occur even in mild winters. It is the overall pattern which is the important component of the Three-Month Outlook”.

The Three Month Outlook is based on output from a number of computer models, including the Met Office’s, which indicates the overall pressure pattern for our latitude to be consistent with a slightly positive phase of the North Atlantic Oscillation, which favours wetter and milder than average conditions. La Niña, established in the tropical Pacific, also increases the chances of milder conditions later in the winter.

Long-range outlooks, such as the Met Office Three-Month Outlook are at the cutting edge of meteorological science, challenging the meteorological community the world over. While our understanding of the science behind atmospheric drivers, along with the technology to produce longer-range forecasts, is improving all the time, they are different to the highly accurate forecasts we are used to using on a daily basis.

The Outlook is produced for planners in government and business who make risk-based decisions. These users are aware of the uncertainties in this type of outlook and will include them in their decision-making process. Their skill or accuracy varies with the time of year and location, due to differences in the dependence of local weather conditions on global-scale atmospheric and oceanic processes. The UK is one of the most challenging regions for which to provide robust long-range information, as UK weather is dominated by the atmospheric circulation over the North Atlantic, which is highly variable.

The Outlook is updated and published monthly. It may change from month to month as the latest information with regard to the global drivers is assessed for their impact on the UK.

For a comprehensive forecast for your area check the 30-day and 7-day forecasts on the Met Office website, mobile app or following us on Twitter and Facebook. Keep track of current weather warnings on the weather warning page.

Date Created
November 2021

Climate projections for heat in UK cities

Description

With the recent COP26 focussing heavily on the chances of keeping global temperature rise below 1.5°C, it might be easy to forget that we are still committed to further climate change and a resulting increase in the frequency and intensity of heatwaves.

The impact of this will be felt increasingly in cities, where the majority of the world's population now live, where much of our businesses, industry and infrastructure are concentrated, and where extreme temperatures are exacerbated by the urban heat island effect.

With many cities across the UK declaring climate emergencies, city councils and other decision-makers are asking how they can use increasingly refined and detailed climate projections to better understand the impact of extreme heat on urban communities.

The Met Office's high-resolution projections from UKCP provide some of the most accurate climate modelling of heat in urban areas available. Dr Will Keat is a Met Office climate scientist who has studied these new projections. He said: "Our most detailed climate projections over the UK also contain a much more realistic representation of cities and other urban areas than used previously. We have found that these projections provide a marked improvement when investigating how extreme temperatures will change in UK cities when compared to less detailed models."

The high resolution projections are being used by scientists working with local authorities tounderstand the effect these changes will have on their cities.

Dr Tyrone Dunbar is the Met Office Scientific Manager for urban climate services. He said: “The concept of urban heat islands – where urban locations retain more heat than surrounding areas – has long been understood. By combining our higher resolution projections with detailed information about where vulnerable people and buildings are in cities, we are helping local authorities and planners gain a far more detailed picture of the impacts their residents and visitors will increasingly face in future.

“The Met Office has been working with a number of local authorities to help inform their heat resilience strategies and planning. When they combine this information with their own mapping they gain a far more clear picture of where the areas of greatest risk are across the city, such as areas of densely populated older housing or if a care home is situated in particularly hot area. This ability to know where to focus effort is extremely important.”

Local authorities are keen to consider how they can make cities more resilient to extreme heat. Different actions can be carried out, such as retrofitting buildings to shade their windows or by increasing green spaces which can provide cool oases within the city. Councils are also making contingency plans to protect residents whenever heatwaves occur.

Victoria Ramsey is a Met Office climate services scientist working with local authorities. She said: “When it comes to emergency planning, we find that a lot of the local authorities we speak to have lots of plans for cold events and flooding events. But increasingly with climate change they are being forced to think more about how heat-related impacts will affect local communities.”

“We can see the impact extreme heat can have on communities from the heatwaves experienced by a number of our UK cities in recent years. For example, in June 2018 the greater Belfast area experienced high temperatures resulting in severe transport disruption to the rail network and schools having to send children outside when classroom temperatures got above 30C. This year saw the first ever amber heat warning over Northern Ireland and the high temperature record was broken three days in a row.”

The Met Office Urban Climate Services team have developed a set of factsheets about climate change for cities around the UK called the City Packs as part of the UK Climate Resilience programme, funded by the Strategic Priorities Fund. The team are currently developing an updated version of this product and are happy to hear from any cities that would like to be added to the shortlist to receive a City Pack – for info please contact urbanclimateservices@metoffice.gov.uk

Date Created
November 2021

Young People’s Questions session at the Met Office Climate Science Conference

Description

Felicity Liggins, Education Outreach Manager

The Met Office Education Outreach team delivers in in-person and virtual events all over the UK and beyond. One of the best things about these events are the brilliant questions young people ask us. Alongside the queries about extreme weather and how much do clouds weigh, they also want to know more about climate change and what they can do to help. Sometimes these questions are fairly easy to answer, other times, they are really tricky!

We decided to use the opportunity of the Met Office Climate Science Conference, held online in May 2021, to crowd-source some answers to the six most common questions from the experts in the virtual room. Have a look below at some of the suggestions they made – they’re short and snappy as they only had 250 characters to play with. Perhaps you’d answer it slightly differently? Or perhaps you want to borrow that answer the next time you get questioned by an 11-year old!

Q: What is a dangerous level of carbon dioxide (CO_2) in the atmosphere?

A: We need there to be a balance of gases for plants, animals and humans to live healthily, so some carbon dioxide is important. However, the more we adjust this finely tuned balance with more CO_2, the more dangerous it might be for humans and animals.

A: CO_2 in the atmosphere is like a blanket that helps to keep the world warm – like the blanket on your bed at night. If there’s too much CO_2, it’s like a blanket that’s too thick, and the world gets too warm – like you getting too hot in your bed.

Q: What skills do you need to work in climate science or related jobs?

A: Curiosity! Climate science is a really big subject which involves everything from complex calculations to creating pictures and writing stories. If you’re interested in climate change and helping people prepare for the future, there’s a job for you!

A: You need to be curious about the world around you. Different jobs need different skills, so there is a place for everyone to use their own skills in various ways. If you’re good at maths or coding, great. If you’re good with people, that’s great too.

Q: What can a 7-year-old do that could have the biggest impact on climate change?

A: Learn as much as you can and talk to everyone you know about climate change. Talk to your parents, your teachers, your friends, and your politicians and make them care about it as much as you do. Eat less meat, walk everywhere, and save energy!

A: You’re already doing great – keep being curious and learning about climate change. You can try walking to school or eating more plants. Make sure to talk to your friends and family about what you’re

doing – maybe they'll make changes too!

Q: What is the greatest threat posed by climate change?

A: Climate change will affect everything and everyone that we care about so the greatest threat is us not doing absolutely everything that we can to limit the changes caused by the world heating and plan for the changes we cannot now stop.

A: Climate change will have different impacts around the world. In some areas the greatest threat will be too little water, in other areas it will be too much water. We need to work together to tackle climate change and reduce threats globally.

Q: What gives you hope?

A: Hope comes from people like you [young people] taking action. It's your generation that will be most affected, and your children, so it's important you keep it up. It's also encouraging that world leaders are working hard to come up with solutions.

A: Thanks to scientists from around the world we have a good idea of how the climate might change in the future. We already have a lot of the technology need to tackle this challenge. Humans have risen up to challenges in the past, let's tackle this one

Q: Is it too late to help?

A: It is absolutely not too late! When we all come together, talk about the science and the solutions, and when we are all our best selves there is no limit to what we can do. There are many solutions still to be thought of so every one of us can help.

A: No! Because of the CO_2 already in the atmosphere we are already committed to a certain amount of warming, however by stopping emissions of greenhouse gases now we can prevent any more warming, and avoid even worse impacts from climate change.

But it's not just young people who ask great questions. Here are some of those that were posed by participants during the Young People's Questions Session, answered by Felicity.

Q: How do you talk about potentially scary subjects (e.g., climate change) to children, especially young ones, without giving them nightmares?

A: This is so important to consider. Climate change is scary for many young people, many adults too, and we don't want to end up leaving them terrified. It's also important to recognise that many young people might already be anxious about other things in their lives – for example, poor physical or mental health or well-being, feeling hungry or having to care for others. Climate change isn't at the top of everyone's worry list and we don't want to add to that.

So, we generally focus on what the young people can do themselves to feel like they have some form of agency. We don't skip over the science, or shy away from talking about the impacts. But we do always build in discussion around adaptation and mitigation, what they can do as individuals and perhaps influence others to do too. These might be those little things that help lower their greenhouse gas emissions. Or perhaps it's sharing their knowledge with others to help more people understand

what's causing climate change and what can be done to help. Or thinking about what they could do at the moment to help keep themselves and their family safe during times of extreme weather. They might even consider what they want to do in the future, and review the skills they have now and might need to develop to have a 'green job' when they're older.

Finishing on the thought that climate change is happening, it is very serious, but there is hope, is perhaps the most important thing you can do to keep those nightmares at bay.

Q: If 74% of young people think Climate Emergency is the most important issue they face and its causing Eco-anxiety, why isn't Carbon Literacy and Climate science in the national curriculum for all pupils and students in primary, secondary and further education? How would you suggest we change this, urgently?

Here in the UK, each nation (England, Scotland, Northern Ireland & Wales) has a different curriculum, with weather & climate/climate change appearing at different stages across each of these. For example, in England, primary school children learn about seasons, rivers & natural resources with climate & climate change coming in more strongly in secondary school. In Scotland, the Curriculum for Excellence links to climate science & climate change throughout many of subjects, including technologies, and health & wellbeing, alongside the sciences.

We recognise there is both a desire from young people to find out more, as well as significant constraints on teachers' time, with some teachers also feeling nervous about teaching what's perceived as a complex & controversial topic. So, when we're designing our online resources for use in the classroom, we don't just focus on communicating the basics of climate or climate change. We look across the different subjects & think about how teachers could use weather or climate as a stimulus.

As an example, we have a resource called Forecasting Fact-busters, which is about fake news & how to recognise an authoritative source – a vital consideration in weather forecast communications & climate science, but also a subject that is being increasingly taught in schools. Another resource is on careers, exploring the different skills needed to be a radar engineer, but also exploring the importance of diversity & inclusion within teams & organisations. And wherever possible within our resources, we make highlight the value of interdisciplinarity (our resources can support lots of different areas of the curricula) & also that climate change is something that affects everyone of us every day in one way or another, so by integrating climate change into teaching as much as possible, we can strengthen understanding and support action.

Q: What are your top tips for scientists who are keen to get more involved in STEM and climate communication but are apprehensive because of, as you've said, children ask difficult questions that individuals may not know the answer to?

A: My first tip is to not worry and to just be open about not knowing! Quite often, it's useful for children to see that adults don't always know the answer. That sometimes we have to go away & find out the answer from other experts & that is part of the way we learn & evolve our own understanding.

So, if I'm at a school talk and I am asked something I'm not sure about, I'll make sure that I make a note of the question, and I will then follow-up with the teacher after the event to give them the answer to pass on to the individual or class. I will also sometimes ask the questioner what they think the

answer is, to see if that creates an interesting discussion (and it might help me create a bit more time to formulate an answer!)

If I'm at an event like a festival, I'll either ask other experts who are there with me or I will ask the person to come back a bit later and, in the meantime, I'll go off to find an answer. Sometimes this means a bit of quick research online, or I might contact a colleague who'll be able to help.

I've found I've learned so much over the years through people asking me questions I didn't know the answer to – It's great!

Q: Over the years I've met so many children's groups around Scotland that are doing fantastic work - campaigning against local issues which impact their environment and have fears of climate change, but I feel this always tends to be in more affluent areas and pushed on them by parents. What sort of things do you think could perhaps encourage and engage children from less affluent areas of the country to take more of an interest?

A: This is something that we think about a lot in our approach to engagement with schools and wider communities. It's also something that I've noticed in some other forums where the climate emergency is being discussed.

In the past, we generally delivered outreach at schools that asked us to, with many of those being located around our HQ here in Devon. Looking at the types of the schools we were visiting, we could see we were not always reaching a full cross-section of society. Many were private or grammar schools, with fewer state schools inviting us to talk to their students. We are now looking at ways to counter this trend. We are working with 'broker'-type organisations who can help us identify & work with schools in social mobility cold spots around the UK, particularly in SW England.

More flexibility on working location for our staff, amplified by the pandemic, has given us the opportunity to look to other areas of the UK that are more diverse than those communities close to our HQ & explore how we can reach into those meaningfully & effectively. We also look to attend festivals that are low cost or free to visitors, or others that are explicitly targeting some of the audiences we haven't traditionally reached.

The other thing to do is to try to make your communications & activities meaningful to those taking part. We know that climate change can suffer from the distance problem (in time and space) but if you can start to talk about the kinds of impacts, they might be seeing in their local community or region today, flooding, heatwave etc, and then contextualising these extremes within a changing climate, climate change can start to become real. But the important thing is to remember not to just focus on the hazards & impacts, but also on the potential adaptation & mitigation solutions that they can implement to help keep themselves safe, both today & into tomorrow.

If you are interested in our education resources, you can find them on www.metoffice.gov.uk/schools . They're still fairly new and we're always adding new ones to the website. We are just in the process of scoping out our next release of bite-size activities and lesson plans, so if you have an idea you would like to see developed, you can always email us on stem@metoffice.gov.uk to share your thoughts!

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